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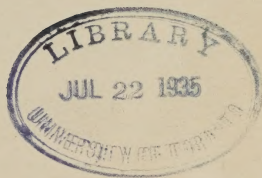
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Canadian Flour




How It Helps The Baker's Profit

This pamphlet describes briefly the distinctive qualities of flour milled from Canadian hard wheat.

The material was assembled by Dr. J. G. Malloch of the National Research Council, Ottawa, who drew upon only the most reliable sources of information—notably upon the results of tests conducted at the Dominion Grain Research Laboratory, Winnipeg. In addition, striking evidence on the merits of Canadian flour has been made available as a result of studies by competent authorities in other countries, especially in Great Britain, United States and Continental Europe.

All of the photographic illustrations were supplied by the Dominion Grain Research Laboratory.



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DEPARTMENT OF TRADE AND COMMERCE
OTTAWA, CANADA

MINISTER
Hon. H. H. STEVENS

DEPUTY MINISTER
JAS. G. PARMELEE

CANADIAN FLOUR

How it Helps
the Baker's Profit

Canadian Flour

CANADIAN flour is one of the world's great travellers. Year after year it crosses the seven seas, entering scores of different countries in all quarters of the globe—wherever high-quality flour is used.

Nearly 400 mills, with a total daily capacity of more than 100,000 barrels, comprise the Dominion's milling industry. Back of that industry lie the vast wheatfields of Western Canada, assuring to Canadian millers a constant supply of the world's finest hard wheat.

The Canadian wheat crop averages about 350 millions of bushels annually. A large proportion is exported for use by millers in other countries to improve the quality of their blends. But the millers of Canada have first access to this huge volume of superior wheat, enabling them to select their own requirements with special advantage. The Canadian wheat-grading system greatly aids the selection of high-quality wheat and, in addition, many of the larger mills maintain their own laboratories to assist them in that respect.

As a result of the combination of choice wheat and careful milling methods, Canadian flour is pre-eminent in quality. Dr. E. A. Fisher, of the Research Association of British Flour Millers, says:—

"Certainly, there is no finer flour in the world than No. 1 Manitoba."

And, again, Dr. Fisher states:—

"Properly mellowed, an all-Manitoba dough gives a magnificent loaf of gold-red crust and large face. Its crumb is very appetizing—of fairly close, even grain, soft but excellent spring, pile and texture, with (when the flour is unbleached) a pale creamy colour and fine bloom."²

Not only does Canadian flour produce excellent loaves when baked by itself, but it can be used to great advantage for blending with other flours.

Canadian mills export five different grades which, named in descending order of quality, include Top Patent, Second Patent, Export Patent, Fancy Clear and First Clear. Thus there is an ample range of choice, permitting the importer in any country or market to select a Canadian flour that will meet the needs of his particular trade.

¹ *Journal of the Society of Chemical Industry*, August 4, 1933.

² Pamphlet No. 10, National Joint Council for the Flour-Milling Industry, London.

Properties of Canadian Flour

1. ABSORPTION

The ability of a flour to take up water is extremely important to the baker. No matter how good a flour may be in other respects, it is not profitable to use it if it will not absorb a large amount of water. Canadian flour, however, not only produces an excellent loaf but also takes up a large quantity of water in the mixer.

Some years ago the United States Department of Agriculture made a study of the flour produced from the principal wheats of the world.¹ The following table showing the absorption of Canadian flour compared with flours produced from the wheats of other countries was compiled from the results of that study. The absorption is expressed as the percentage which the weight of the water added bears to the weight of the flour:—

	Absorption, Per Cent
Canadian.....	60.9
Argentine.....	56.1
Australian.....	54.8
English.....	52.6
German.....	53.2
Italian.....	53.0
Russian.....	57.1
United States—	
Hard red spring.....	58.2
Hard red winter.....	57.9

Thus, if the flour from a single kind of wheat is to be used alone, there is no doubt whatever of the superiority of the Canadian product. However, it is not necessary to use Canadian flour by itself to get the benefit of its high absorption. It can be blended with the flour already in use to give a substantial improvement in the ability to take up water. The extent of this improvement will be roughly proportional to the amount of Canadian flour used. The following tables, prepared from data obtained in the Dominion Grain Research Laboratory, Winnipeg, Canada, illustrate this point:—

FLOUR BLENDS

Canadian, Per Cent	German, Per Cent	Absorption, Per Cent
100	—	64.7
—	100	59.0
15	85	59.8
25	75	60.3
40	60	61.3
Canadian, Per Cent	French, Per Cent	
100	—	64.7
—	100	58.0
15	85	59.0
25	75	59.6
40	60	60.7
Canadian, Per Cent	Argentine, Per Cent	
100	—	65.0
—	100	62.8
25	75	63.3
50	50	63.9

¹ Technical Bulletin No. 197, U.S. Dept. of Agriculture.

A similar study was made in the Cereal Laboratories of the University of Saskatchewan, using Australian and English wheat flour, and the results are given below:—

Canadian, Per Cent	Australian, Per Cent	Absorption, Per Cent
100	—	66
—	100	61
20	80	62
60	40	64
Canadian, Per Cent	English, Per Cent	
100	—	66
—	100	57
20	80	61
60	40	65

It will be readily seen that the use of Canadian flour enables the baker to incorporate more water in his doughs.

2. YIELD OF BREAD

Canadian flour yields a large number of loaves per barrel and in this respect excels most other flours.

The U.S. Department of Agriculture has collected information on this subject, which is presented in the following table:—

Wheat	Yield of Bread per Barrel (196 Lbs.) Lbs.
Canadian.....	293
Argentine.....	285
Australian.....	286
English.....	285
German.....	283
Italian.....	285
Russian.....	289
United States.....	289

According to these figures, Canadian flour will give at least four pounds of bread per barrel more than that from any of the other countries listed. It will give as much as ten pounds more than some of the soft wheat flours.

These findings of the United States officials are supported by the classification of wheats on the basis of bread yield, given by Mr. W. S. Thompson in *Milling*, November 5, 1932. His classification is as follows:—

<i>Good</i>	<i>Medium</i>	<i>Poor</i>
Canadian	Barusso (Argentine)	Yeoman I and II (English)
Northern Spring (U.S.)	Australian	Danubian
Karachi (Indian)	Baril (Argentine)	Red Winter (U.S.)
Persian	Durum	White Pacific (U.S.)
Hard Winter (U.S.)	Rosafe (Argentine)	German
	Russian	Red English
		French
		White English

BLENDING RESULTS

The superiority of the bread yield from Canadian flour when baked alone is an indication of the improvement that may be obtained by blending it with low-yielding flours. The following table, showing the increase in bread yield resulting from blending Canadian with German flour, is compiled from results obtained some years ago by the State Institute of Baking Research, Berlin, and shows the averages of three separate tests with different flours:—

BLEND

German	Canadian	Bread Yield
Per Cent	Per Cent	
100	—	137
—	100	141
70	30	139
50	50	141

Thus it will be seen that the use of Canadian flour not only gives better bread but also substantially increases the number of loaves obtained for each unit of flour.

3. DOUGH QUALITY

QUANTITY AND QUALITY OF GLUTEN

A good flour must make a dough which has stability, springiness and the ability to retain the gas generated by the yeast. The ability of a flour to do this depends to a great extent on the quality and quantity of the gluten or protein. It is the protein that binds the other dough constituents together to form the elastic films which retain the gas.

Since the excellence of the doughs made from Canadian flour is due to the large quantity of good-quality gluten which it contains, it is of interest to compare the gluten content with that of other flours.

The following table is compiled from figures obtained by the United States Department of Agriculture:—

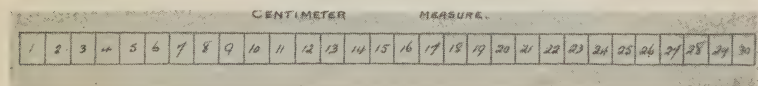
Wheat from which Flour was Milled	Protein in Flour Per Cent
Canadian.....	12.4
Argentine.....	10.4
Australian.....	9.3
German.....	10.2
Indian.....	9.4
Italian.....	10.2
Russian.....	11.3
United States—	
Hard Red Spring.....	12.0
Hard Red Winter.....	10.0
Soft Red Winter.....	9.2

Dr. D. W. Kent-Jones, Chief Chemist of Woodlands, Ltd., millers, Dover, England, reports a series of tests of gluten percentage in flours milled from different wheats, with remarks on the quality. The following is condensed from his table:—

Wheat	Gluten	Remarks
	Per Cent	
Canadian.....	13.2	Very good.
English.....	6.2	Quite good elasticity and standing power.
Australian.....	9.0	Fair to good.
Rosafe (Argentine).....	10.5	Quite good.
Red English.....	7.4	Poor quality, ran flat.
White Karachi (Indian).....	10.3	Good.
Northern Spring (U.S.).....	12.5	Good.
Manchurian.....	12.7	Only fair.

It is not possible to give figures to express the quality of the gluten since no one has yet succeeded in measuring this property of flour. We have to rely on descriptive terms such as those used by Dr. Kent-Jones in the above table. It is possible, however, to show the characteristics of the gluten by other means, and a study of the photographs which follow will leave no doubt of the superiority of Canadian flour in this respect. The extensibility, stability and expansion of the gluten of Canadian flour, compared with that of a typical soft European flour, and the improvement in the latter by blending with Canadian flour, are well illustrated in the following plates:—

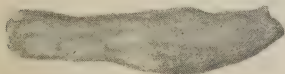
PLATE 1.—Comparative Extensibility of the Glutens from Canadian and a Typical European Soft Flour



100% Manitoba One Northern Flour

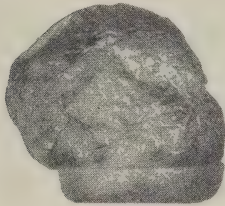


75% Typical European Soft Flour. 25% Manitoba One Northern Flour



100% Typical European Soft Flour

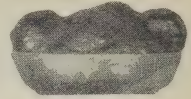
PLATE 2.—Comparative Stability and Expansion of the Glutens from Canadian and a Typical European Soft Flour



100% Manitoba One Northern Flour



75% Typical European Soft Flour
25% Manitoba One Northern Flour



100% Typical European Soft Flour



100% Manitoba One Northern Flour



75% Typical European Soft Flour
25% Manitoba One Northern Flour



100% Typical European Soft Flour

These photographs, and the tables preceding them, show very definitely that Canadian flour has a high content of gluten of excellent quality.

4. DOUGH QUALITY

GAS RETENTION AND FERMENTATION TOLERANCE

The high content of fine-quality gluten enables Canadian flour to yield an excellent dough. It is elastic and retains gas well, is easy to handle in the bakeshop, and will retain these qualities over long periods of fermentation.

The following table compiled by Dr. W. Litzendorff, of the Georg Plange Co., millers, of Dusseldorf, Germany, indicates how a weaker flour may be improved in handling characteristics and in gas retention as a result of being blended with the Canadian product:—

Flour	Working of Dough	Height of Dough in Cylinder
<i>Highest Grade—</i>		
100% German.....	Short, moist.....	184
50% German, 50% Canadian.....	Good, comparatively moist.....	199
<i>Second Grade—</i>		
100% German.....	Weak, moist.....	145
50% German, 50% Canadian.....	Good, comparatively moist.....	165

The blending of Canadian flour with the German flour markedly increased the "rising" of the dough, and improved the handling qualities. In order to take full advantage of its high gas-retaining power, Canadian flour should be blended with a high-gassing flour. Malt extract should be used in the baking formula if Canadian flour is used unblended.

The excellent gas-retaining power, and the consequent great expansion of doughs from Canadian flour, are further shown in the following table and in the plates which give the results of experiments conducted by the Dominion Grain Research Laboratory, Winnipeg.

Flour	Maximum Height of Dough	Time Dough Remained at Maximum Height
	Centimetres	Minutes
Canadian.....	425	40
Australian.....	355	20
English.....	310	10
French.....	320	10
German.....	335	15
Italian.....	320	15
Canadian 25% + Italian 75%.....	350	20

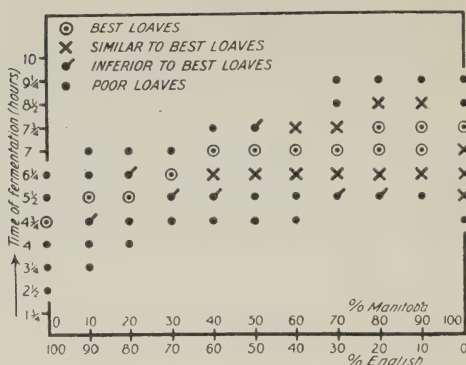
The ability to give great expansion and to stand prolonged fermentation is one of the outstanding features of Canadian flour. The table given above shows that doughs made from it rose more, and that they sustained their maximum volume for double the length of time, as compared with any of the other flours studied.

This characteristic of flour milled from Canadian wheat is further shown in the results of experiments reported¹ by Dr. E. A. Fisher, Director of Research, the Research Association of British Flour Millers.

Dr. Fisher baked a series of loaves from flours made from English and Manitoba (Canadian) wheats, and from blends of the two, using varying periods of fermentation with each blend. The 100 per cent English flour only gave one satisfactory loaf (at $4\frac{3}{4}$ hours fermentation), whereas the 100 per cent Manitoba (Canadian) gave satisfactory loaves when fermented for any period from $5\frac{1}{2}$ to $7\frac{3}{4}$ hours. It should be noted that in these experiments only 1 per cent of yeast was used. By increasing the amount of yeast, or by the addition of flour improvers such as arkady or malt extract, the time necessary to produce good loaves from Canadian flour could be substantially reduced. The full results of the experiment are shown graphically as follows:

¹ *Journal of the Society of Chemical Industry*, August 4, 1933.

PLATE 3.—Baking quality of Canadian-English Blends



In discussing these results Dr. Fisher says:—

“Obviously a flour with a wide fermentation tolerance will ‘stand up’ better to a variety of treatments than would a weak flour of restricted tolerance. The fermentation tolerance increased with increasing content of Manitoba, slowly at first, then more rapidly A strong flour which produces good bread over a long period is obviously more fool-proof, requires less care and attention during fermentation, is less likely to go wrong in the event of accident or inadvertence, and is consequently worth more to the baker than a weaker flour.”

5. DOUGH QUALITY

STABILITY

The stability of dough, or its ability to rise instead of flattening out, is closely related to the gas-retaining capacity.

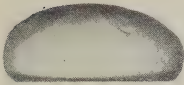
In *Milling*, a leading British trade paper, for November 5, 1932, Mr. W. S. Thompson gives a classification of the wheats of the world on the basis of the ability of flours milled from them to give stable doughs. The wheats are placed in three classes and in order of merit within each class:—

<i>Good</i>	<i>Medium</i>	<i>Poor</i>
Karachi (Indian)	Baril (Argentine)	Danubian
Persian	Durum	Yeoman I and II (English)
Canadian	Russian	Red Winter (U.S.)
Northern Spring (U.S.)	Rosafe (Argentine)	White Pacific (U.S.)
Australian	Hard Pacific (U.S.)	Red English
Hard Winter (U.S.)		White English
Barusso (Argentine)		

It will be seen that Canadian flour is almost at the top of the list. The two wheats which give flours of greater stability are of minor importance because flour milled solely from them is not a factor in world commerce.

The Dominion Grain Research Laboratory has recently completed tests of the stability of the flours made from a series of different wheats. The results are shown photographically in the following plates.

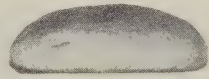
PLATE 4.—Doughs from Canadian and Typical Soft Flours after Normal Fermentation and allowing to Stand for One Hour



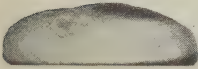
100% No. 1 Manitoba



100% English



100% French



100% Italian

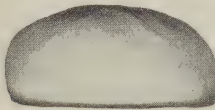


100% German



100% Australian

PLATE 5.—Doughs from Soft Wheat Flour Blended with Canadian after Normal Fermentation and Allowing to Stand for One Hour



100% No. 1 Manitoba



100% Italian



85% Italian
15% No. 1 Manitoba



75% Italian
25% No. 1 Manitoba

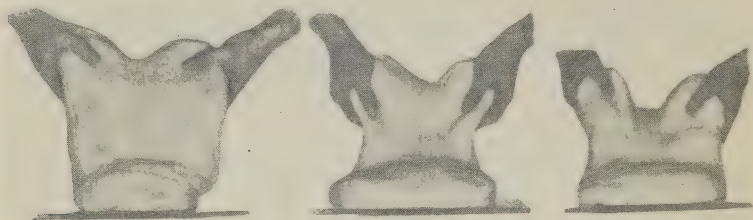


60% Italian
40% No. 1 Manitoba

The second plate shows very strikingly the beneficial effect of blending even small percentages of Canadian flour with soft wheat flours.

Dough must have a certain "toughness" to handle well in the bakery, particularly when machinery is used. The following photograph contrasts an easily-worked dough, made from Canadian flour, with a typical "runny" dough made from European soft flour, and shows the improvement brought about in the latter by blending with 25 per cent of Canadian flour.

PLATE 6.—Doughs from Canadian and a Typical European Soft Flour after Normal Fermentation



100% Manitoba One Northern Flour

75% Typical European Soft Flour
25% Manitoba One Northern Flour

100% Typical European Soft Flour

6. BAKING QUALITY (a)

Although the quality of the dough is important, the vital question as to the merit of any flour will always be, not "Will it produce good dough?" but "Will it produce good bread?" All other tests of flour are subordinate to this main requirement. The combination of flour qualities which makes possible the baking of first-class bread is referred to as "strength," although this term is also used in other senses.

Strength is the chief feature of Canadian flour. The high absorption, the high percentage of good-quality gluten, and the desirable dough qualities all contribute to its ability to produce first-class loaves. Provided the baker ensures adequate gas production and proper development of the dough, Canadian flour will always give excellent bread. Proper development can be ensured by using an adequate amount of active yeast, by adding improvers, or by extending the fermentation period.

In a leading British trade paper, Mr. W. S. Thompson has classified the wheats of the world on the basis of the strength of the flour produced from them; as in the list previously given he has divided the wheats into three classes and has arranged them in order of merit within each class.¹

<i>Good</i>	<i>Medium</i>	<i>Poor</i>
Canadian	Persian	Red Winter (U.S.)
Northern Spring (U.S.)	Karachi (Indian)	Danubian
Russian	Baril (Argentine)	White Pacific (U.S.)
Hard Winter (U.S.)	Australian	German
Barusso (Argentine)	Hard Pacific (U.S.)	Red English
	Durum	White English
	Yeoman I and II	French
	Rosafe (Argentine)	

¹ *Milling*, November 5, 1932.

Dr. D. W. Kent-Jones gives strength figures for the flours produced from the more important classes of wheat.¹ These are tabulated below:—

Wheat	Strength Figure
Canadian.....	66-76
Northern Spring (U.S.).....	60-66
Hard Winter (U.S.).....	55-57
Red Winter (U.S.).....	32-37
Pacifics (U.S.).....	18-30
Rosafe (Argentine).....	32-58
Barusso and Baril (Argentine).....	about 50
Australian.....	about 50
Bombay (Indian).....	about 40
Karachi (Indian).....	about 50
Persian.....	47-62
Manchurian.....	about 58
Red English.....	24-28
White English.....	19-23
Yeoman (English).....	38-40

Canadian wheat is at the top of the list in both classifications. Since Canadian millers use only the best of Canadian wheat, it follows that Canadian flour is the strongest flour obtainable.

Dr. E. A. Fisher, of the Research Association of British Flour Millers, after discussing the improved fermentation tolerance obtained by blending Manitoba (Canadian) wheat with English wheat, says:—

“The strong flour also gives the larger better-risen loaf because the gluten network is better able to hold the gas liberated during the final stage of fermentation and expanded during the first few minutes in the oven. The outside appearance of the loaf is altogether more handsome and the loaf more saleable in consequence. Its crumb is much better developed; it is softer, more elastic, has greater power of recovery if ‘thumbed’ and its grain, or vesiculation of the crumb, is more attractive. In short, it is more appetising.”²

Not only will Canadian flour make excellent bread when baked alone but it can be blended with weaker flours to improve their quality. The addition of Canadian flour to a blend will increase the size of the loaves and frequently improve also the texture of the crumb, and the shape and appearance of the loaf. It has been found in practice and by experiment that Canadian flour will “carry” a considerable proportion of a weaker flour in a blend.

¹ *Modern Cereal Chemistry*.

² *Journal of the Society of Chemical Industry*, August 4, 1933.

The following table gives results obtained by Professor M. P. Neumann, Director, State Institute of Baking Research, Berlin.

Blend		Loaf Volume	Texture	Baking Number or General Baking Quality
Canadian, Per Cent	German, Per Cent	Cubic Centimetres of Bread Produced from 400 grams of Dough		
<i>Patent Flour—</i>				
100	.....	1091	8	130
.....	100	698	8	.....
20	80	997	7-8	105
30	70	1022	8	114
40	60	1027	8	116
50	50	1096	8-9	132
<i>Baker's Flour—</i>				
100	.....	1079	8-9	134
.....	100	830	8	38
20	80	969	8	101
30	70	1004	7-8	104
40	60	1029	8	131
50	50	1125	7-8	128
<i>Sponge Dough Method—</i>				
100	.....	909	8	86
.....	100	845	8	44
30	70	889	7-8	64
50	50	894	8	67

The results of Professor Neumann's experiment show very clearly the beneficial effect of blending Canadian flour with a weaker flour. The size of the loaf is increased, roughly in proportion to the percentage of Canadian flour in the blend. This increase in size is brought about without any deterioration in the other loaf qualities. The general baking quality, as indicated by the "baking number," shows very substantial improvement.

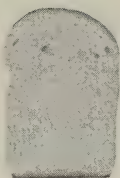
7. BAKING QUALITY (b)

Three eminent British authorities have been quoted to indicate the high reputation in respect to baking quality of flour milled from Canadian hard wheat. The results of an experiment conducted by one of the outstanding cereal chemists of Germany have also been given to show that weaker flours may be materially improved by blending with Canadian flour. The following paragraphs, presenting results obtained by the Dominion Grain Research Laboratory, Winnipeg, Canada, emphasize the fact that the beneficial effects of blending Canadian flour hold true with regard to a wide range of other flours.

PLATE 7



100% No. 1 Manitoba
Loaf Volume 2940 cc.



100% German
Loaf Volume 2060 cc.



85% German
15% No. 1 Manitoba
Loaf Volume 2350 cc.



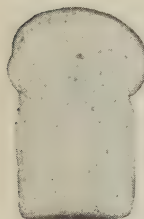
75% German
25% No. 1 Manitoba
Loaf Volume 2590 cc.



60% German
40% No. 1 Manitoba
Loaf Volume 2800 cc.

Flour Blends		Absorption	Loaf Volume		Texture	Crumb Colour	Exterior Appearance	General Baking Quality
Canadian	German							
Per Cent 100	Per Cent 100	Per Cent 64.7 59.0	Cu. Cm. 2940 2060	Per Cent 100	Good Good	Cream Cream yellow	Very good Fair	Excellent Fair
15	85	59.8	2350	114	Good	Cream yellow	Fairly good	Fairly good
25	75	60.3	2590	126	Good	Cream	Good	Good
40	60	61.3	2800	136	Good	Cream	Good	Very good

PLATE 8



100% No. 1 Manitoba
Loaf Volume 2940 cc.



100% English
Loaf Volume 1840 cc.



85% English
15% No. 1 Manitoba
Loaf Volume 2130 cc.



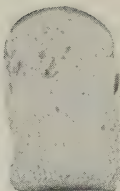
75% English
25% No. 1 Manitoba
Loaf Volume 2430 cc.



60% English
40% No. 1 Manitoba
Loaf Volume 2650 cc.

Flour Blends		Absorption	Loaf Volume		Texture	Crumb Colour	Exterior Appearance	General Baking Quality
Canadian	English							
Per Cent 100	Per Cent 100	Per Cent 64.7 58.2	Cu. Cm. 2940 1840	Per Cent 100	Good Good	Cream Dull cream yellow	Very good Very poor	Excellent Very poor
15	85	59.2	2130	116	Good	Dull cream yellow	Poor	Fair
25	75	59.8	2430	132	Good	Cream yellow	Fairly good	Fairly good
40	60	60.8	2650	144	Good	Cream yellow	Good	Good

PLATE 9

100% No. 1 Manitoba
Loaf Volume 2940 cc.100% French
Loaf Volume 2070 cc.85% French
15% No. 1 Manitoba
Loaf Volume 2300 cc.75% French
25% No. 1 Manitoba
Loaf Volume 2570 cc.60% French
40% No. 1 Manitoba
Loaf Volume 2760 cc.

Flour Blends		Absorption	Loaf Volume		Texture	Crumb Colour	Exterior Appearance	General Baking Quality
Canadian	French							
Per Cent	Per Cent	Per Cent	Cu. Cm.	Per Cent				
100	.....	64.7	2940	.....	Good	Cream	Very good	Excellent
.....	100	58.0	2070	100	Good	Slightly yellow	Fair	Fair
15	85	59.0	2300	111	Good	Slightly yellow	Fair	Fairly good
25	75	59.6	2570	124	Good	Cream	Fairly good	Good
40	60	60.7	2760	133	Good	Slightly yellow	Good	Good

PLATE 10

100% No. 1 Manitoba
Loaf Volume 2940 cc.100% Italian
Loaf Volume 2000 cc.85% Italian
15% No. 1 Manitoba
Loaf Volume 2280 cc.75% Italian
25% No. 1 Manitoba
Loaf Volume 2500 cc.60% Italian
40% No. 1 Manitoba
Loaf Volume 2610 cc.

Flour Blends		Absorption	Loaf Volume		Texture	Crumb Colour	Exterior Appearance	General Baking Quality
Canadian	Italian							
Per Cent	Per Cent	Per Cent	Cu. Cm.	Per Cent				
100	.....	64.7	2940	.....	Good	Cream	Very good	Excellent
.....	100	58.5	2000	100	Good	Slightly yellow	Poor	Poor
15	85	59.4	2280	114	Good	Slightly yellow	Fair	Fair
25	75	60.0	2500	125	Good	Cream	Fairly good	Fairly good
40	60	61.0	2610	131	Good	Slightly yellow	Good	Good

PLATE 11

100% No. 1 Manitoba
Loaf Volume 2940 cc.100% Australian
Loaf Volume 2450 cc.85% Australian
15% No. 1 Manitoba
Loaf Volume 2600 cc.75% Australian
25% No. 1 Manitoba
Loaf Volume 2690 cc.60% Australian
40% No. 1 Manitoba
Loaf Volume 2800 cc.

Flour Blends		Absorption	Loaf Volume		Texture	Crumb Colour	Exterior Appearance	General Baking Quality
Canadian	Australian							
Per Cent	Per Cent	Per Cent	Cu. Cm.	Per Cent				
100	.....	64.7	2940	.....	Good	Cream	Very good	Excellent
.....	100	60.1	2450	100	Good	Cream Cream yellow	Fairly good	Fairly good
15	85	60.8	2600	106	Good	Cream yellow	Good	Good
25	75	61.2	2690	110	Good	Cream	Good	Good
40	60	61.9	2800	114	Good	Cream	Very good	Very good

The results given below for the blending of Canadian and Argentine flours are the averages of twelve tests—four flours baked by three different methods.

Flour Blends		Loaf Volume	Texture	Dough Quality	Baking Quality
Canadian	Argentine				
Per Cent	Per Cent	Cu. Cm.			
100	—	2833	Good—Excellent	Lively and very springy	Very good—Excellent
—	100	2489	Good	Lively and fairly springy	Fairly good
25	75	2607	Good	Lively and springy	Good
50	50	2709	Good	Lively and springy	Good—Very good

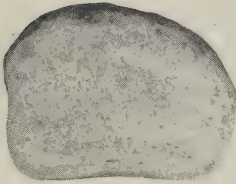
It is easily seen that blending with Canadian flour gave better results than the use of other flours alone. In all cases there were marked increases in the volume of the loaves produced by the blended flours. Even the relatively strong Australian flour was improved by as much as 16 per cent. In no case was there any deterioration in the other loaf characteristics. The texture remained about the same, and there was marked improvement in the external appearance of the loaves baked from some of the flours. Similar results can be obtained when Canadian flour is blended with any weaker flour.

Pan loaves were used in all these experiments, but the results of similar experiments, using hearth-baked loaves, are presented in succeeding pages.

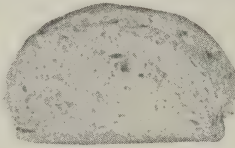
8. BAKING QUALITY (c)

The results of experiments conducted by the Dominion Grain Research Laboratory, using hearth-baked loaves, are shown photographically. They prove beyond question the superiority of Canadian flour by this exacting test of baking quality.

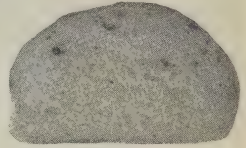
PLATE 12.—Foreign and Canadian Flours Alone (Front View)



100% No. 1 Manitoba
Loaf Volume 3000 cc.



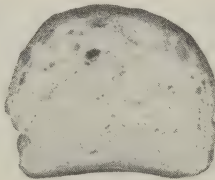
100% English
Loaf Volume 1830 cc.



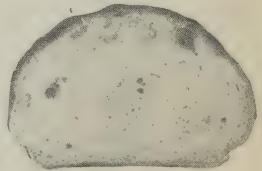
100% French
Loaf Volume 1830 cc.



100% Italian
Loaf Volume 1880 cc.



100% German
Loaf Volume 1930 cc.



100% Australian
Loaf Volume 2180 cc.

PLATE 13.—Foreign and Canadian Flours Alone (Back View)

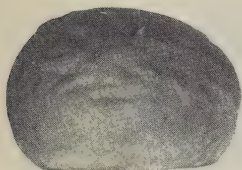
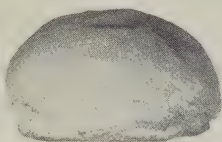
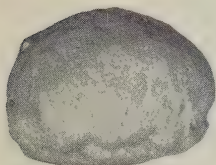
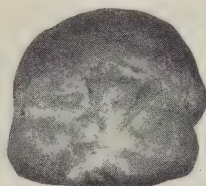
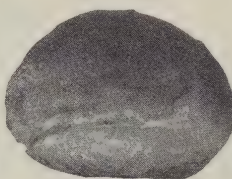
100% No. 1 Manitoba
Loaf Volume 3000 cc.100% English
Loaf Volume 1830 cc.100% French
Loaf Volume 1830 cc.100% Italian
Loaf Volume 1880 cc.100% German
Loaf Volume 1930 cc.100% Australian
Loaf Volume 2180 cc.

PLATE 14.—Blends of Italian and Canadian (Front View)

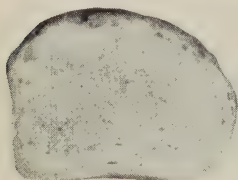
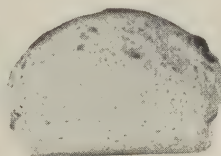
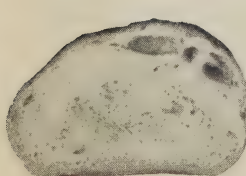
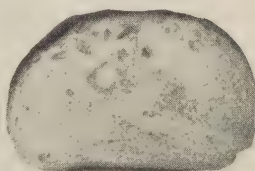
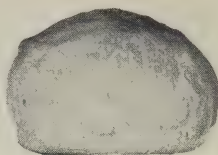
100% No. 1 Manitoba
Loaf Volume 3000 cc.100% Italian
Loaf Volume 1880 cc.85% Italian
15% No. 1 Manitoba
Loaf Volume 2100 cc.75% Italian
25% No. 1 Manitoba
Loaf Volume 2360 cc.60% Italian
40% No. 1 Manitoba
Loaf Volume 2630 cc.

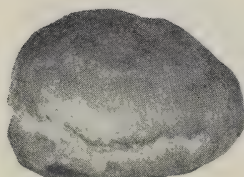
PLATE 15.—Blends of Italian and Canadian (Back View)



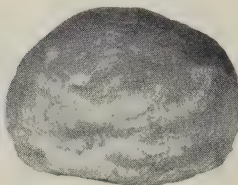
100% No. 1 Manitoba
Loaf Volume 3000 cc.



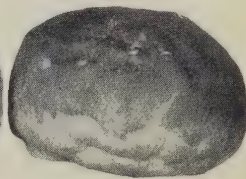
100% Italian
Loaf Volume 1880 cc.



85% Italian
15% No. 1 Manitoba
Loaf Volume 2100 cc.



75% Italian
25% No. 1 Manitoba
Loaf Volume 2360 cc.



60% Italian
40% No. 1 Manitoba
Loaf Volume 2630 cc.

Hearth loaves are a more exacting test of the quality of flour than pan loaves since any weakness will be shown up by a tendency to spread rather than to rise. The superiority of Canadian flour is even more marked by this test than it is when pan loaves are baked. It stands up well and its volume is appreciably larger than that given by the other flours. In addition, the external and internal appearance of the Canadian loaf is superior. The blending tests with Italian wheat flour show marked improvement as the percentage of Canadian flour in the blend is increased.

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HOW CANADIAN FLOUR EXCELS

- (1) Takes up a large quantity of water.
- (2) Gives a high yield of bread.
- (3) Makes good-quality, easily handled stable doughs.
- (4) Stands long fermentation and has good fermentation tolerance.
- (5) Gives good results with shorter fermentation if sufficient yeast or improvers are used.
- (6) Makes fine, large, appetizing loaves.
- (7) Confers all these qualities on blends, roughly in proportion to the amount of Canadian flour used.

